Alerts, Notices, and Case Reports

Mycotic False Aneurysm of the Superficial Femoral Artery

Delayed Complication of Salmonella Gastroenteritis in a Patient With the Acquired Immunodeficiency Syndrome

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MYCOTIC INFECTION of a blood vessel arises from the bacterial seeding of an atherosclerotic plaque or other damaging processes such as blunt trauma that may predispose to the development of a pseudoaneurysm (false aneurysm). Gram-negative bacilli, chiefly *Salmonella* species, account for roughly 35% of such cases.[1] *Salmonella enteritidis* is the serotype responsible in 40% of the latter cases of infection, a proportion similar to its overall isolation rate for gastrointestinal disease in the United States.[2,3] *Salmonella* species have long been recognized as a common cause of mycotic aneurysms in persons without human immunodeficiency virus (HIV) infection.[4] Risk factors for this vascular complication include advanced age,[5] the intra-arterial administration of illicit drugs,[6,7] and ongoing septicemia from salmonella infection.[8] Of patients older than 50 years not infected with HIV but with salmonella bacteremia, it is estimated that an intravascular focus of infection develops in 25%.[9]

The literature on the acquired immunodeficiency syndrome (AIDS) is sparse regarding descriptions of mycotic aneurysm infection due to *Salmonella* species, with cases limited to involvement of the abdominal aorta.[10-13] *Salmonella enteritidis* is an important cause of diarrhea in HIV-infected persons[14]; thus, it is surprising that mycotic aneurysms are not more commonly described in patients with AIDS. Indeed, recurrent salmonella bacteremia serves as an AIDS-defining illness.[15,16]

Although no angiographic study exists that looks at the presence of peripheral vascular disease in AIDS patients, the infrequent reporting of cases of mycotic aneurysms in such persons is postulated to be due to the epidemiology of HIV infection, which involves younger persons less apt to have underlying atherosclerotic disease. In addition, mycotic aneurysms often cause vague symptoms.[6,11] Finally, physician suspicion for this complication is probably low.

Herein is described a unique case of an AIDS patient in whom a superficial femoral artery pseudoaneurysm due to *S enteritidis* developed as a delayed complication of infectious diarrhea. The clinical circumstances, symptoms, and physical signs that should alert physicians to the presence of a mycotic aneurysm are highlighted. Recommendations regarding diagnostic testing are provided for the detection of this treatable but possibly life-threatening illness.

Report of a Case

The patient, a 39-year-old homosexual man, first sought medical care at the Washoe County District Department of Health's Early HIV Intervention Clinic (Reno, Nevada) in March 1992. On presentation, he showed advanced disease manifested by cachexia and a $CD4^+$ lymphocyte count of 13×10^6 per liter (13 cells per mm^3). His baseline physical examination was remarkable only for severe exfoliative dermatitis of his hands and feet. There was no history of AIDS-related opportunistic infections. The patient had a 30-pack-year smoking history. A regimen of zidovudine and dapsone was prescribed. Severe dermatologic manifestations dominated the patient's course, requiring the use of potent topical steroids. He did remarkably well with only occasional attacks of thrush. In March 1993, zidovudine was discontinued, and a regimen of didanosine was prescribed. In June 1993, he had an abrupt attack of bloody diarrhea. The patient did not seek medical advice and took loperamide hydrochloride (Imodium) for three days. This last medication was stopped by the clinic physician, who prescribed a ten-day course of oral ciprofloxacin, 500 mg twice a day. The patient responded quickly to this medication, but discontinued ciprofloxacin after only two days. Culture of a stool specimen isolated a group D *Salmonella* serotype (*enteritidis*). Ova and parasite analysis was negative. The patient did well without a recurrence of his diarrhea.

In mid-December, the patient fell on an icy sidewalk, noting right thigh pain and swelling. Noninvasive studies of his lower extremities were obtained to rule out a traumatic deep venous thrombosis. Duplex imaging showed an aneurysm of the right superficial femoral artery. On admission, the patient was not acutely ill, and his temperature was not elevated. On physical examination, he had psoriasis, thrush, and a tender mass located along the adductor canal just above the right knee. Distal pulses of the right leg were intact, and no pulsatile mass was noted. Admission laboratory studies revealed an established low-grade anemia, a normal leukocyte count, an increased Westergen sedimentation rate of 85 mm per hour, and normal coagulation values. Arteriography

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ABBREVIATIONS USED IN TEXT

AIDS = acquired immunodeficiency syndrome
HIV = human immunodeficiency virus

demonstrated atherosclerotic plaquing of the distal infrarenal aorta and focal 80% stenosis at the origin of the right common iliac artery, requiring dilatation by balloon angioplasty. Subsequently, a large, 5-cm pseudoaneurysm arising from the distal superficial femoral artery was seen. Blood specimens were drawn for culture and the patient's pain controlled with analgesics. Surgical dissection the next morning isolated this pseudoaneurysm. An incision resulted in the drainage of pus, and Gram's stain of this material showed numerous gram-negative rods. The involved vessel was completely disrupted and removed with an end-to-end anastomosis (4 cm in length) completed using an autogenous saphenous vein graft. The area was debrided, resulting in vascular reconstruction through an uninfected tissue plane.

Postoperative intravenous antibiotic therapy was begun empirically using metronidazole, gentamicin sulfate, and vancomycin hydrochloride. The following day, cultures of both the blood and a specimen from the infected pseudoaneurysm isolated *Salmonella* group D (*enteritidis*). The organism was susceptible to a wide variety of antimicrobial agents, and intravenous cefazolin was chosen. The patient did well postoperatively without any fevers or evidence of distal embolization. An echocardiogram revealed no valvular vegetations to suggest bacterial endocarditis. He felt well enough to be discharged two weeks after the operation and completed an oral course of ciprofloxacin, 750 mg twice a day, over a four-week period.

Discussion

This case describes the development of a pseudoaneurysm of a superficial femoral artery as a delayed complication from infectious diarrhea due to *S enteritidis*. No doubt the patient's lack of compliance in completing a full course of antibiotic therapy contributed to this unusual vascular problem. This patient had unusually severe, preexisting, atherosclerotic large-vessel disease. Indeed, he had an 80% stenosis of the right common internal iliac artery requiring balloon angioplasty to visualize his distal extremity vasculature. Although he had rapid resolution of his diarrheal symptoms, bacteremia from *S enteritidis* likely ensued and established a vascular focus of infection. Another contributing factor may relate to the patient's self-medication with an antimotility drug early in the course of his diarrheal illness. This may have prolonged the intestinal clearing of salmonella infection, increasing his chance of a sustained period of bacteremia. In healthy non–HIV-infected persons admitted to hospital for disseminated salmonellosis, a common historical finding is the oral administration of an antidiarrheal agent.[17]

This case highlights the difficulty in diagnosing a mycotic aneurysm infection in a patient with AIDS. This complication is not a common opportunistic infection. A recent Multicenter AIDS Cohort study listing the AIDS-defining conditions in 844 persons did not report vascular complications from salmonella bacteremia in the list of illnesses.[18] In earlier case reports of mycotic aneurysm due to this organism in HIV-infected persons, the abdominal aorta was involved.[10,12,13] In such cases, prodromal symptoms have been vague abdominal discomfort and low-grade fever.[11] Physicians must maintain a heightened awareness of this vascular complication, especially when caring for patients with AIDS who are older or have a heavy smoking history and who show physical evidence of atherosclerotic disease. Following a diarrheal illness due to *S enteritidis* infection in such patients, the presence of unexplained abdominal pain or fever should prompt a thorough vascular examination. Distal extremity pulses must be assessed for their symmetry and the presence of a pulsatile mass evaluated.[19]

The diagnosis in this patient became evident from the striking physical abnormalities of swelling in the groin characteristic of femoral artery aneurysms.[20] Although such aneurysms have been well described in patients with injection drug use,[7] clinically differentiating them from a groin abscess is difficult, and diagnostic attempts at incision and drainage may result in brisk bleeding.[6] Noninvasive ultrasound studies may serve for initial screening purposes due to their lower cost, availability, and ease of accurately determining the size and location of an aneurysm.[19] Abnormal results must be followed by angiographic evaluation, however.[21] The latter provides detail of the pseudoaneurysm and the integrity of distal runoff and helps to assess limb viability.

Although surgical experience with the treatment of mycotic aneurysms due to *S enteritidis* infection is limited, reports of cases in HIV-infected patients describe success, with long-term survival and graft patency of as long as 21 months.[11] Surgical success is related to the isolation and resection of the pseudoaneurysm, the debridement of locally infected tissue, and vascular reconstruction through uninfected tissue planes using autogenous grafting.[22,23]

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Prevention and Management of Hypernatremic Dehydration in Breast-fed Infants

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SEVERAL REPORTS in the medical literature over the past 15 years have detailed the clinical course of critically ill breast-fed children with hypernatremic dehydration shortly after birth, all of whom required vigorous therapeutic efforts.[1-7] The child in the case reported here is such an infant, who became desperately ill with hypernatremic dehydration. Like some but not all of those in the cases reported, he seems to have recovered without sequelae.

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Report of a Case

The patient was born to a 23-year-old gravida 1, para 0 woman at 41 weeks' gestation, weighing 2,843 grams after an uncomplicated pregnancy. Apgar scores were 8 at one minute and 9 at five minutes. The nursery stay was without complication, and the nurses' notes indicated that the mother was breast-feeding well. A circumcision was done when the infant was about 30 hours old, and mother and infant were discharged several hours later. Weight on the morning of discharge was 2,727 grams (decreased 4.8% from birth). As was usual for babies discharged within 48 hours, the child had an appointment scheduled three days later. At that visit, the mother expressed concern over the infant's fussiness during nursing and infrequent stools and urination. The findings of an examination were normal except for mild icterus (the serum bilirubin level was 227 μmol per liter [13.3 mg per dl]). The infant at this time weighed 2,560 grams (10% less than at birth). The mother strongly desired to breast-feed her infant and was given recommendations on infant care and feeding.

At 7 days of age, the patient was brought to the clinic by his parents who were concerned because he had had fever for about 8 hours and no urine output for approximately 24 hours. He was febrile, moderately lethargic, and markedly dehydrated, with dry mouth, dry sunken eyes, and a pronounced loss of skin turgor. He weighed 2,132 grams (24% below birth weight). The baby was moderately jaundiced.

Initial laboratory results included the following: serum sodium 182, potassium 3.5, chloride 138, and bicarbonate 25 mmol per liter; urea nitrogen (BUN), 73.2 mmol per liter (205 mg per dl); and creatinine, 212 μmol per liter (2.4 mg per dl). The leukocyte count was 9.0×10^9 per liter (9,000 per mm^3) with a normal differential; hemoglobin, 137 grams per liter (13.7 mg per dl); and platelet count, 321×10^9 per liter (321,000 per mm^3). A blood culture was later reported as negative for pathogens, as was the culture of the spinal fluid; the cerebrospinal fluid was xanthochromic (probably due to neonatal jaundice; the serum bilirubin level was 258 μmol per liter [15.1 mg per dl]), with 45 erythrocytes $\times 10^6$ per liter and 1 monocyte $\times 10^6$ per liter; the glucose level was 2.7 mmol per liter (48 mg per dl), and the protein level was 0.77 grams per liter (77 mg per dl).

An intravenous catheter was placed, and the child was given two boluses of 20 ml per kg of a solution of normal saline with 5% dextrose over the first hour. Antibiotics (ampicillin and gentamicin sulfate) were administered intravenously (they were discontinued two days later when the cultures were reported as negative). When the serum sodium level became available, the intravenous fluid was changed, first to dextrose with 0.675% sodium chloride and then to dextrose with 0.45% sodium chloride when no seizures occurred. The fluid infused was calculated to replace losses slowly over 24 hours to avoid rapid fluid shifts. Urine output